

Khwopa College, Bhaktapur, Nepal

One Day Seminar on Wetlands; Fish for Tomorrow ?, a Glance.

Introduction:

The Bureau of Estuaries, Swamps, Lakes, Tidal flats, Mangroves, Coral Reefs, Ponds etc has come up with slogan as 'Fish for Tomorrow?' for the World Wetlands Day 2007, which has given a new dimensional approach for the conservation of wetlands. Ramsar Bureau, where it should emphasize wetlands, has astonished by its 'Fish' in its slogan for many of us. This year, Ramsar is concerned about the wetlands through the term 'Fish'. More generally, through the 8th criteria for being a Ramsar site.

Ramsar has reported that Fish has been direct source of protein for the nearly 17 percent people in the world and 35 million people are directly associated with activity related to fisheries. The demand for fish has doubled in last fourty years and many ecosystems like Mangroves, Coral Reefs as well as Inland wetlands may have significant impact due to the fishing activities and its growing demand.

Nepal is a mountainous country with flat land of 23% of total land which is known by Terai region. There are four Ramsar sites with on preparation to include others, all of which are located in the Terai belt. With highest human population density, the belt produces 55.4 % of the basic crop in the country. Further, studies reveal that there is greater risk of shrinkage of wetlands in this belt due to agricultural activities. Fishing in context of Nepal, are not that much risen issue and since fishing and related activities are often in small scale and at rural level, we do not have strong database for how much we are fishing and simultaneously, how much we are posing threats to wetlands in Nepal.

We the students of Environmental Science of Masters level at Khwopa College in Bhaktapur, organized One Day Seminar on Wetlands on the occasion of World Wetlands Day 2007, on 1st of February, 2007. Our themes were

- Wetland and Fisheries
- Wetland and livelihood
- Wetland and Policy
- Wetland and Conservation.

With aim and objective of in depth understanding of wetlands through interaction of several counterparts and identification of issues that is needed to pronounce for development, we included presentation from

1. Fisheries Research Division, Lalitpur
2. Department of National Park and Wildlife Conservation, Kathmandu,
3. International Union for Conservation of Nature (IUCN Nepal)
4. International Center for Integrated Mountain Development (ICIMOD)
5. World Wildlife Fund for nature Conservation (WWF Nepal)
6. Khwopa College

From Khwopa College, there were two presentations related to Wetlands.

We had participation of 126 with majority of students at University level. The number includes, experts, researchers from various fields.

The Program:

The program was held in four sessions; Inaugural session, Technical Session-I, Technical Session II and the Concluding session.

Inaugural Session:

With session hosting by Mr. Kamal Gosain student of m. Sc. at Khwopa College, the honorary Chairman of Nepal Workers and Peasants Party, Mr. Narayan Man Bijukchen inaugurated the program. The Chairperson of the Session was held by the Coordinator of the Seminar Organizing Committee; Mr. Nirmal Chaudhary. Respected principal of Khwopa College; Dr. Rajan Suwal welcomed the invited participants, presenters and the guests. Speeches were invited from the following guests.

Mr. Indra Prasad Karki (Executive Officer), Bhaktapur Municipality
Mr. Jhamak Bdr, Karki (Assistant Ecologist), Department of National Parks and
Wildlife Conservation
Mr. K.S. Awal (HOD), Dep. of Environmental Science, Khwopa College
Dr. B.N. Upreti (Dean), Science and Technology, Tribhuvan University
Mr. Prem Suwal (Chairman), Executive Board, Khwopa College
Mr. Narayan Man Bijukchen(Chairman), Nepal Workers and Peasants Party

Seminar, Wetland, Consortium, Students and Environment were the Key words in the speeches.

Technical Session-I

The session chairing was by respected Dr. Ash Kumar Rai (Ex-Chief, Fisheries Research Division) and the session was hosted by Miss Maya Kumari Bhatta (Student; M. Sc. Khwopa College).

The session was initiated by the lead paper presentation entitled '**Scope of fisheries in wetlands management for livelihood enhancement of rural community in Nepal**' by Dr. Tek Bahadur Gurung from Fisheries Research Division, Lalitpur. Dr. Gurung emphasized, with successful exemplary fisheries in the western Nepal, if the fishery is undertaken with care of citizenry, equity and ancestral ownership, there is ample opportunity to increase the productivity of wetlands and simultaneously the sustainable use of wetland will occur, as the SWOT analysis of fishery management has revealed.

Mr. Jhamak Bahadur Karki from Department of National park and Wildlife Conservation presented the second lead paper entitled '**Fish for tomorrow?: In the wetlands of the protected areas of Nepal**'. Mr. Karki viewed that the slogan and the theme of the World Wetland Day 2007 signifies direct relevance to the people with their livelihood as well as to the aquatic wildlife. The wetlands in Terai can be wisely used for food resource and income generation. The 3 out of 8 endemic fishes of Nepal thrive in the wetlands of mid-hill and mountain region. The wetlands in the hill and the mountain region, due to climatic limitations, can be utilized for non-consumptive use such as Eco-tourism. Further, fishes with cold habitat can be farmed for economic benefits in those regions.

On behalf of the IUCN Nepal, Mr. Deependra Joshi presented on title of '**Ramsar Convention and sustainable and wise use of wetlands in Nepal**'. He vowed that the Ramsar Bureau

emphasizes the conservation and wise use of wetlands as these are ecosystems important for biodiversity conservation onto human well being. The Ramsar Bureau encourages contracting parties to establish multi-stakeholder and Multi-sectoral National Wetland Committee to mainstream wetland issues into national policy and practice because of shared water system, species and trans-frontier wetlands. In the past, an informal wetland committee helped to develop the National Wetland Policy, 2003. The informal committee has now been revived and is working on wetland management issues of Nepal.

Mr. Man Kumar Dhamala, on behalf of his study team of three members of Khwopa College presented paper entitled '**Study of Water Pollution of Hanumante River, Bhaktapur**'. Their study consisted of studying the Hanumante River in three aspects; human population, riparian vegetation and wastewater irrigation. On laboratory analysis, all the water pollution indices were found higher than the standard guidelines values. The unsystematic disposal of wastes in the river has polluted the river and has become unsuitable for irrigation and the adjacent riparian vegetation development. The river water used for irrigation, does not comply with the standard guideline values as recommended by the Food and Agriculture Organization for irrigation. RARC tools revealed that the status of the vegetation is very poor in the North with the average condition in the South. The more environmental problem has been occurred due to the unawareness of the polluted river in the locals.

Dr. Ash Kumar Rai concluded and declared the session ending.

Technical Session-II

The technical session-II was hosted by Miss Prativa Kaspal, (student, M. Sc. Khwopa College) and the session chair was held by Dr. Chet Bahadur Pariyar, Water and Environmental expert, member of Research Committee, Khwopa College).

Mr. Li Zhuoqing on behalf of his study team presented his paper entitled '**Mapping High Altitude Wetlands in Himalaya: Combining multispectral and ecological characteristic with a simple wetland extraction model**'. Their team has developed, tested and propose a hybrid wetland extraction model to accurately classify high altitude wetland land cover. The hybrid model combines month-on-month multi-spectral classifications of moderate resolution satellite (MODIS) data with a simple wetland extraction model based on knowledge of the spectrum and wetland ecological characteristics in the high altitude region. On application of this model to the Tibetan Plateau using MODIS data, they, found that their remote sensing based methodology gave satisfactory result. Further testing this model by applying into high resolution satellite data (Land sat) at sub-basin level, the results were in agreement with field interviews. The wetland information extraction shows that the model can extract wetlands in the Himalayan region automatically with minimal ground knowledge. The high altitude wetlands mapped by the proposed hybrid wetland extraction model provides decision makers with salient information about extent and distribution of high altitude wetlands, and have the potential to in response to global warming and human activities. Hence, there is an urgent need to quantify these ecosystems through a comprehensive mapping exercise for the benefit of planners and decision-makers.

Miss Ram Devi Tachamo from Khwopa College presented paper entitled '**Macro invertebrates as bio indicators in lentic environment**' on behalf of her study team. The study was performed to make inventory list of macro invertebrates and determine the ecological status of the studied ponds and lake. The studies in three artificial ponds namely Bhaju Pokhari, Rani Pokhari and central Zoo pond and one natural Lake Taudaha during April to November 2006 gave saprobic

water quality ranging from II to IV with reference to scores of Ganga River System. The finding of their study was that the natural wetland was critically polluted whereas the artificial ponds were heavily polluted.

There was documentary show on behalf of the WWF Nepal entitled '**Wetlands for Life**' as the last presentation of the Seminar. The WWF Nepal showed the importance of the functions of wetlands in Nepal and dependency of ethnic people like Tharu, musahar, Bote and others immediately on it and the attentions that are needed for conservation.

Concluding Session:

The concluding session was chaired by Dr. Dinesh Raj Bhujju, (Chief Executive Officer, Resources Himalaya Foundation, Lalitpur). The program hosting was done by Miss Prativa Kaspal.

Mrs. Yogita Hada; lecturer of Zoology; Khwopa College presented the Rapporteurs summary.

The conclusions are:

- The concept of the 'Wise Use' of the Ramsar Convention on Wetland can be made more meaning full through the development of fisheries in the wetlands. i.e. Sustainable aquaculture could be the effective tool for assuring wetland conservation together with 'Use'.
- However due to endemism of wetland in the mid hills and high mountains, non-consumptive use should be done such as eco-tourism.
- Application of modern tools such as Remote Sensing and GIS and Bio-monitoring, can be effective and scientific in assessing the wetlands be it in the high mountains or in Terai.
- The management issues are bonded with the ethnic people depending on wetlands and the consideration of ethnicity, citizenry and traditional ownership for wetland management is quite necessary.
- Pollution has been the major problem for the wetland health. Pollution effects wetlands and its ecological functions and moreover to the people dependent on it. Management of waste disposal, education, awareness are needed to safeguard the wetland health.

The gaps for wetland conservation identified are:

- There is greater need of assessment of the wetlands with their geographical and socioeconomic characteristics in Nepal.
- The multiple functions of wetlands and their service to human through several ways, are more important to assure development of the wetland dependent people.
- The wetlands need to be conserved as per its ecological and spiritual functions.
- Pollution from various sources in wetlands is still needed to be pronounced with more depth.
- The wetland counterparts and related institutions should jointly act for the conservation of wetlands.

After the distribution of certificates to the presenters and the supporters by Dr. Bhujju, Remarks were given by him. He advocated that there are about fifty definitions on Wetlands as mentioned in the National Wetland policy, 2003. Since Ramsar is the internationally authorized body, adopting the definition of Wetlands as defined by the Ramsar would have been better instead of

creating the 51st definition by the Wetland Policy. Further, the definition of wetland as most fertile, biodiversity rich is invalid too. Not all the wetlands are fertile and rich in biodiversity for instance, wetlands in the Himalayas are not fertile, not rich in biodiversity due to the local climate. In fact they are rich in endemism. Biodiversity and Endemism are two unrelated words. Rich endemism does not imply rich in biodiversity. After the remarks, the concluding session was ended by the chair.

The Seminar Organizing Committee expresses pride for inauguration of the program by Honorary, Chairman of Nepal Workers and Peasants Party, Mr. Narayan Man Bijukchen with extension of this pride for the Chairperson of Executive Board, Mr. Prem Suwal, Executive Officer of Bhaktapur Municipality, Mr. Indra Prasad Karki, and for the representation from DNPWC, Mr. Jhamak Bdr. Karki .

Supports were gathered from the college, different governmental and nongovernmental organization as well as private sectors. The support from WWF Nepal Programme, NTNC, NGO- Forum, Resources Himalaya Foundation, Ramsar Bureau, Switzerland, the Consortium coordinated by DNPWC and others are credited for the success of the program.

The total expenditure for the seminar program was NRs.19087/-. The Seminar Organizing Committee bears obligations to the supporters. The Committee is thankful to Dr. Ash Kumar Rai, Dr. Chet Bahadur Pariyar, Dr. Dinesh Raj Bhujju, Mr. Ukesh Raj Bhujju,

the college administration and to all those participants and friends, including those who have contributed for the success of the program directly and indirectly.

Annex-I

Report Compilation: The Seminar Organizing Committee

Program: One Day Seminar on Wetlands

Venue: Seminar Hall-1, Khwopa Engineering College, Libali, Bhaktapur

Organizer: Environmental Science, M. Sc. Final Year, Khwopa College, Dekwacha, Bhaktapur

The Advisory Board:

Dr. Rajan Suwal (Principal, Khwopa College)

Mr. Krishna Sundar Awal (H.O. D. Env. Science, Khwopa College)

Mr. Suman Panthee (Lecturer, Geology)

Mr. Shakti P. C. (Lecturer, Meteo- Hydrology)

Mr. Sanu Raja Manandhar (Lecturer, Ecology)

The Seminar Organizing Committee:

Coordinator: Mr. Nirmal Chaudhary

Secretary: Mr. Bhanu Bhattarai

Treasurer: Mr. Susheel Dangol

Spokesperson: Mr. Resham Baniya

Member: Mr. Ram Krishna Duwal

Annex- II

Summary:

Lead paper I: Scope of fisheries in wetlands management for livelihood enhancement of rural community in Nepal

Presenter/ Author: Dr. Tek Bdr. Gurung (Fisheries research division, Lalitpur)

Summary:

Majority of wetlands in mid hills and southern terai faces the problems of encroachment, draining, eutrophication and ownership. Fisheries are tightly coupled with wetlands. Therefore, for sustainable management of wetland one of the most socially and ecologically acceptable approach could be fisheries for economic and social benefit with the ownership to surrounding communities. In Nepal, there are at least 18 different communities, constituting about 11% of the total population traditionally depending directly or indirectly on wetlands for obtaining food, water, income and other opportunities besides utilization of wetlands for recreational, social and religious purposes. The SWOT analysis of wetland management using fisheries revealed, there could be ample opportunities for enhancing wetlands productivity. Care must be taken giving substantial consideration to citizenry, equity and valuing traditional ownership to local communities for avoiding conflict. Successful fisheries in several wetlands from eastern to western particularly from Pokhara Valley have demonstrated to be the exemplary for fisheries as well as sustainable wetland management. This approach has been emphasized for further scaling-up in other parts of the country for sustainable management of the wetlands.

Lead Paper II: Fish for tomorrow: in the wetlands of the Protected Areas of Nepal

Presenter/Author: Mr. Jhamak Bdr. Karki (DNPWC, Kathmandu)

Summary:

Wetlands by virtue of having wet, dry and intermediate form of land, certainly holds more importance when compared to any other land independently. Wetlands occupy approximately 5% of total area of Nepal, ranging from high altitude glacial lakes to hot springs, ponds, oxbow lakes to river flood plains, swamps to marshes. Realizing the significance of wetlands on various aspects like biodiversity richness, livelihood of the wetland dependent people and its contribution on the purification of water sources, the Ministry of Forest and Soil Conservation, Nepal has declared four Ramsar sites, which falls on the Terai region. The theme fish for tomorrow of the world wetland day 2007 signifies direct relevance to the local communities for their livelihood and earnings. The mid-hill and mountain wetlands are more important for the conservation of 3 of the 8 endemic fishes of Nepal with potential to provide livelihood through non-consumptive use such as eco-tourism. The clear, unpolluted, cold water is potent for fish farming with colder habitat in the highland wetlands of Nepal.

Lead Paper-III: Mapping High Altitude Wetlands in Himalaya: Combining multispectral and ecological characteristic with a simple wetland extraction model

- Li Zhuoqing, Xu Jianchu and Rajendra L. Shilpakar
Kunming Institute of Botany, the Chinese Academy of Sciences
and ICIMOD

Presenter: Li Zhuoqing

Summary:

High altitude wetlands of the Himalayan, including lakes, are critical for regulating flows of major rivers in the region. These important ecosystems are often not found on land cover, land use and land planning maps in the region. This mapping exercise will prove extremely important for the detection of changes in these ecosystems. In particular, as the wetland complexes are transitional land cover, it is difficult to accurately map using either digital image processing or visual interpretation. Understanding spatial and temporal pattern of these wetlands and their hydrological processes are key step towards wise use and conservation of high altitude wetlands. In response to the Ramsar Himalayan Initiative to conserve High Altitude Wetlands and Lakes in the region, a hybrid wetland extraction model to accurately classify these wetland land cover is proposed, developed and tested. The hybrid model combines month-on-month multi-spectral classifications of moderate resolution satellite (MODIS) data with a simple wetland extraction model based on knowledge of the spectrum and wetland ecological characteristics in the high altitude region. The model is applied to the Tibetan Plateau in the Himalaya by using MODIS data. Compared with the best available sources for lakes and wetlands on global scale and national scale, we find that the remote sensing based methodology gives satisfactory result. The wetland information extraction shows that the model can extract wetlands in the Himalayan region automatically with minimal ground knowledge. We further tested this model by adjusting parameter applying into high resolution satellite data (Landsat) at sub-basin level, the results are in agreement with field interviews of local experts. The high altitude wetlands mapped by the proposed hybrid wetland extraction model provide decision makers with salient information about extent and distribution of high altitude wetlands, and have the potential to in response to global warming and human activities. Hence, there is an urgent need to quantify these ecosystems through a comprehensive mapping exercise for the benefit of planners and decision-makers.

Guest Paper: Ramsar Convention and sustainable and wise use of wetlands in Nepal

Presenter/Author: Mr. Deependra Joshi (IUCN Nepal)

Summary:

With the mission of conservation and wise use of all wetlands through local, regional and national actions and international cooperation for achieving sustainable development throughout the world, the Ramsar convention emphasizes on the conservation and wise use of wetlands, and recognizes wetlands as ecosystems that are extremely important for biodiversity conservation for the well-being of human communities. The national commitment includes Poverty reduction, Nepal Biodiversity Strategy 2002, Water Resources Strategy 2002, Wetland Policy 2003 whereas the Global commitment are Convention on Biological Diversity, Ramsar Convention and CITES. The first obligation under the Convention is to designate at least one wetland for inclusion in the List of Wetlands of International Importance. Promotion for wise use and adopting sustainable development principles of wetlands, establishing nature reserves in wetlands, whether or not they are included in the Ramsar List, promoting training in the fields of wetland research, management and wardening are the national obligations. Consultation with other Contracting Parties about the implementation of the Convention, especially in regard to trans-frontier wetlands, shared water systems, and shared species, reporting on progress in implementing the commitments under the Convention by submission of triennial National Reports to the Conference of the contracting parties is also other national commitments. The Ramsar Bureau encourages contracting parties to establish multi-stakeholder and Multi-sectoral National Wetland Committee to mainstream wetland issues into national policy and practice. In the past, an informal wetland committee helped to develop the National Wetland Policy, 2003. The informal committee has now been revived and is working on wetland management issues of Nepal.

Technical Paper I: Study of Water Pollution of Hanumante River, Bhaktapur

- Man K. Dhamala, Bhanu Bhattarai and R. K. Duwal,
Khwopa College

Presenter: Man Kumar Dhamala (M. Sc. Student, Khwopa College)

Summary:

The present paper highlights the status of water pollution of Hanumante River, Bhaktapur with a focus on human population, riparian vegetation and wastewater irrigation. The study was done by analyzing the key physicochemical indices, sampling the vegetation, interviews and questionnaire. The burgeoning human population in core urban area and areas having high human pressure with unsystematic waste disposal culture has affected the quality of water for human consumption including irrigation and riparian vegetation composition. Results showed an increase in all the water pollution indices with respect to the standard guidelines values. The riparian vegetation is limited to narrow strip on either sides of the stream. *Salix babylonica*, an exotic species was most dominated. Under story vegetation were mainly shrubs, herbs and few climbers, the common shrub species were *Sambucus canadensis*, *Artemisia* sp, *Phragmites karka* etc. RARC tools revealed that the status of the vegetation is very poor in the North with the average condition in the South. The wastewater irrigation in Bhaktapur is an old practice of irrigating agricultural lands. In the absence of a suitable alternative source many farmers still prefer waste water because of its high nutrient content, reliability and availability close to their lands. The quality of wastewater presently used, however, does not comply with the standard guideline values as recommended by the Food and Agriculture Organization for irrigation water quality. Although the majority of farmers are aware of wastewater related health hazards, 59% of the people interviewed were infected with the wastewater borne diseases such as hookworms, skin and intestinal diseases. Preventive measures could save the river environment and maintain the River health and health of general populace. Appropriate policies and guidelines on how to optimize the benefits and minimize the health/environmental risks of this practice are lacking in the country.

Technical Paper-II: Macro invertebrates as Bio indicators in Lentic Environment

- Ram Devi Tachamo, Deep Narayan Shah & Hasko Nesemann
Khwopa College and Kathmandu University

Presenter: Miss Ram Devi Tachamo (M. Sc. Student, Khwopa College)

Summary:

Biological monitoring is the use of biological response to assess changes in the environment, generally due to anthropogenic causes. The study was performed to make inventory list of macro invertebrates and determine the ecological status of the studied ponds and lakes. The study was conducted in three artificial ponds namely Bhaju Pokhari, Rani Pokhari and central Zoo pond and one natural lake Taudaha in the Kathmandu valley. The study was conducted from April to November 2006. Hand nets of 1mm mesh size were used to make qualitative samples of macro invertebrates and by handpicking the animals from different substratum. The proposed scores for the Ganga River System (GRS BIOS) is applied for water quality assessment. Altogether 40 taxa were recorded. Insecta were dominating non-insecta. Bryozoa, belonging to ceolentrata phylum, Tipulidae (running water indicators) were recorded only from the Zoo pond. The saprobic water quality class ranged from II to IV. The natural lake Taudaha was critically polluted while the artificial ponds were heavily polluted.